CLAIMS:

What is claimed is:

1. A diffusion resistor comprising:

a substrate;

a diffusion region formed in the substrate;

a first contact region extending down from a surface of the substrate;

a second contact region extending down from the surface of the substrate;

a first contact connected to the first contact region;

a second contact connected to the second contact region; and

a third contact connected to the surface of the substrate, wherein the third contact is located between the first contact and the second contact, wherein the third contact forms a Schottky diode such that application of a voltage to the third contact forms a depletion region that changes in size depending on the voltage applied to the third contact to change a resistance in the depletion resistor.

2. The diffusion resistor of claim 1, wherein the third contact is connected to the surface by a salicided region.

3. The diffusion resistor of claim 1, wherein the substrate is a p-type substrate.

4. The diffusion resistor of claim 1, wherein the substrate is an insulator in a silicon-on-insulator substrate.

5. The diffusion resistor of claim 3, wherein the first contact region and the second contact region are n+ contact regions.

6. The diffusion resistor of claim 5, wherein first contact, the second contact, and the third contact are formed using metal layers.

7. The diffusion resistor of claim 6, wherein the metals layers are tungsten metal layers.

8. The diffusion resistor of claim 1, wherein the diffusion region contains n-type dopants having a concentration of about 1 x $10^{15}/cm^3$.

9. The diffusion resistor of claim 1, wherein the first contact region and the second contact region contain n-type dopants having a concentration of about 1 x $10^{18}/cm^3$ to about 1 x $10^{20}/cm^3$.

10. A method for forming a diffusion resistor, the method comprising:

forming a diffusion region in a substrate;

forming a first contact region and a second contact region in the diffusion region, wherein the first contact region and the second contact region extend downward from a surface of the substrate;

forming a first contact on the first contact region and a second contact on a second contact region; and

forming a third contact on the surface of the substrate, wherein the third contact is located between the first contact and the second contact, wherein the third contact forms a Schottky diode such that application of a voltage to the third contact forms a depletion region that changes in size depending on the voltage applied to the third contact to change a resistance in the depletion resistor.

11. The method of claim 10, wherein the step of forming the depletion region comprises: implanting n-type dopants into the substrate.

12. The method of claim 11, wherein the n-type dopants implanted into the diffusion region have a concentration of about 1 x $10^{15}/cm^3$

13. The method of claim 11, wherein a doping profile of the n-type dopants is selected to

reduce parasitic capacitance.

14. The method of claim 11, wherein the step of forming the first contact region and the second contact region comprises:

implanting n-type dopants into the depletion region in a concentration of about 1 x $10^{18}/cm^3$ to about 1 x $10^{20}/cm^3$.

15. The method of claim 10, wherein the step of forming the first contact and the second contact comprises:

depositing a metal layer onto the first contact region and the second contact region.

16. The method of claim 14, wherein the metal layer is a tungsten metal layer.

17. The method of claim 10, wherein the substrate is a p-type silicon substrate.

18. The method of claim 10, wherein the substrate is an insulator in a silicon-on-insulator substrate.

19. The method of claim 10 further comprising:

forming shallow trench isolation regions prior to forming the diffusion region.